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REPUBLIC OF SOUTH AFRICA

EPARTEMENT VAN HANDEL  
EN NYWERHEID



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PEI/ZA03/00109

10/524428 **Certificate**

REPUBLIC VAN SUID-AFRIKA PATENT OFFICE

DEPARTMENT OF TRADE AND  
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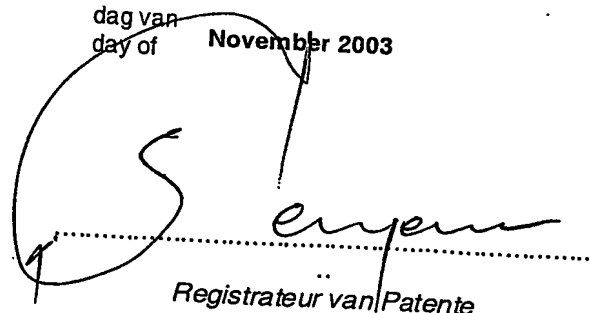
Application form P.1, P.2 and provisional specification of South African Patent No. 2002/8170 as originally filed in the Republic of South Africa on 10 October 2002 in the name of **BALMORAL TECHNOLOGIES (PROPRIETARY) LIMITED** for an invention entitled: "METHOD OF PRODUCING A HYDRAULIC BINDER OR THERMOPLASTIC CONTAINING PRODUCT".

**PRIORITY DOCUMENT**  
SUBMITTED OR TRANSMITTED IN  
COMPLIANCE WITH  
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TORIA in die Republiek van Suid-Afrika, hierdie  
in the Republic of South Africa, this

13th

dag van  
day of November 2003

  
Registrateur van Patente

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**APPLICATION FOR A PATENT**  
AND ACKNOWLEDGEMENT OF RECEIPT  
(Section 30 (1) - Regulation 22)

R 0060.00

HASR 711

The granting of a patent is hereby requested by the undermentioned applicant on the basis of the present application filed in duplicate

OFFICIAL APPLICATION NO.

21 01 2002/8170

REPUBLIC OF SOUTH AFRICA  
S & F REFERENCE

PA134053/P

FULL NAME(S) OF APPLICANT(S)

71 BALMORAL TECHNOLOGIES (PROPRIETARY) LIMITED

ADDRESS(ES) OF APPLICANT(S)

BUILDING 16, CSIR CAMPUS, MEIRING NAUDE ROAD, SCIENTIA, PRETORIA, GAUTENG, SOUTH AFRICA

TITLE OF INVENTION

54 METHOD OF PRODUCING A HYDRAULIC BINDER OR THERMOPLASTIC CONTAINING PRODUCT

THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANYING FORM P.2. THE EARLIEST PRIORITY CLAIM IS:

COUNTRY: NIL

NUMBER: NIL

DATE: NIL

THIS APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO.

21 01

THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND IS BASED ON APPLICATION NO.

21 01

THIS APPLICATION IS ACCOMPANIED BY:

- ☒ 1. A single copy of a provisional specification of 7 pages.
- ☒ 2. Drawings of 2 sheets.
- ☐ 3. Publication particulars and abstract (Form P.8 in duplicate).
- ☐ 4. A copy of Figure of the drawings (if any) for the abstract.
- ☐ 5. Assignment of invention.
- ☐ 6. Certified priority document.
- ☐ 7. Translation of the priority document.
- ☐ 8. Assignment of priority rights.
- ☐ 9. A copy of the Form P.2 and the specification of S.A. Patent Application No.
- ☐ 10. Declaration and power of attorney on Form P.3.
- ☐ 11. Request for ante-dating on Form P.4.
- ☐ 12. Request for classification on Form P.9.
- ☒ 13. Form P.2 in duplicate.
- ☐ 14. Other.

74 ADDRESS FOR SERVICE: SPOOR & FISHER, SANDTON

Dated: 10 October 2002

SPOOR & FISHER  
PATENT ATTORNEYS FOR THE APPLICANT(S)

RECEIVED

REGISTRAR OF PATENTS

OFFICIAL APPLICATION		LODGING DATE: PROVISIONAL		ACCEPTANCE DATE		
21	01	2002/8		22	10 OCT 2002	
INTERNATIONAL CLASSIFICATION		LODGING DATE: COMPLETE		GRANTED DATE		
51			23			
FULL NAME(S) OF APPLICANT(S)/PATENTEE(S)						
71	BALMORAL TECHNOLOGIES (PROPRIETARY) LIMITED					
APPLICANTS SUBSTITUTED:				DATE REGISTERED		
71						
ASSIGNEE(S)				DATE REGISTERED		
71:						
FULL NAME(S) OF INVENTOR(S)						
72	SYMONS, MICHAEL WINDSOR					
PRIORITY CLAIMED		COUNTRY		NUMBER		
N.B. Use International abbreviation for country (see Schedule 4)		33	NIL	31	NIL	
				32	NIL	
TITLE OF INVENTION						
54	METHOD OF PRODUCING A HYDRAULIC BINDER OR THERMOPLASTIC CONTAINING PRODUCT					
ADDRESS OF APPLICANT(S)/PATENTEE(S)						
BUILDING 16, CSIR CAMPUS, MEIRING NAUDE ROAD, SCIENTIA, PRETORIA, GAUTENG, SOUTH AFRICA						
ADDRESS FOR SERVICE				S & F REF		
74	SPOOR & FISHER, SANDTON			PA134053/P		
PATENT OF ADDITION NO.			DATE OF ANY CHANGE			
61						
FRESH APPLICATION BASED ON			DATE OF ANY CHANGE			

REPUBLIC OF SOUTH AFRICA  
PATENTS ACT, 1978

## PROVISIONAL SPECIFICATION

(Section 30(1) – Regulation 27)

OFFICIAL APPLICATION NO.

21	01	: 2002/8 170
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LODGING DATE

22	10 OCTOBER 2002
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FULL NAMES OF APPLICANTS

71	BALMORAL TECHNOLOGIES (PROPRIETARY) LIMITED
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FULL NAMES OF INVENTORS

72	SYMONS, MICHAEL WINDSOR
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TITLE OF INVENTION

54	METHOD OF PRODUCING A HYDRAULIC BINDER OR THERMOPLASTIC CONTAINING PRODUCT
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### **BACKGROUND OF THE INVENTION**

This invention relates to a method of producing a product from a flexible open cell polymeric foam element and an inorganic binder or a thermoplastic material, and to the product so made, and is an addition to, improvement in or modification of the inventions described in South African Patent Applications Nos 2002/5395, 2002/5960 and 2002/6532.

### **SUMMARY OF THE INVENTION**

According to a first aspect of the invention there is provided a method of producing a product from:

- (a) a flexible open cell polymeric foam element; and
- (b) a binder selected from:
  - (i) a hydraulic binder slurry; or
  - (ii) a mixture of a pozzolan and either lime or Portland cement in the form of a slurry;

(iii) a synthetic geopolymer precursor slurry; or

(iv) a thermoplastic material in liquid form;

which includes the steps of:

(1) introducing the binder into the open cells of the foam element by either:

(i) compressing the foam element to exclude air from the open cells and then releasing the compression with the foam element in contact with the binder so that the binder penetrates and becomes contained in the open cells of the foam element; or

(ii) impregnating the binder into the foam element under pressure so that the binder penetrates and becomes contained in the open cells of the foam element; and

(2) allowing the binder to set or harden and dry to form the product.

According to a second aspect of the invention there is provided a product comprising an open cell polymeric foam element containing a set binder as described above in the open cells. The product is preferably made by the method described above.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

**Figure 1** is a schematic diagram of an embodiment of the method of the invention;

**Figures 2a and 2b** are schematic diagrams of the preparation of a pipe according to the invention;

**Figure 3** is a schematic diagram of the manufacture of a pole according to the method of the invention; and

**Figure 4** is a plan view of the pole of Figure 3.

**DESCRIPTION OF EMBODIMENTS**

The first aspect of the invention is the method of producing a product from a flexible open cell polymeric foam element and a binder.

The first component is the flexible open cell polymeric foam element, and this is described in SA Patent Application No 2002/5395. Further examples are natural or synthetic latexes, the latter being acrylates.

The second component is a binder.

The binder may be a hydraulic binder slurry and this is described in SA Patent Application No 2002/5395 and SA Patent Application No 2002/5960.

The binder may also be a mixture of a pozzolan and either lime or Portland cement in the form of a slurry, or a synthetic geopolymer precursor slurry, and these are described in SA Patent Application No 2002/5960.

The binder may also be a thermoplastic material in liquid form, i.e in molten, solution or emulsion form. Various suitable thermoplastic materials are described in SA Patent Application No 2002/6532.

The first step of the method of the invention is to introduce the binder into the open cells of the foam element. This may be achieved by compression or by impregnation under pressure.

Various techniques of introducing the binder into the open cells of the foam element by compression are described in SA Patent Applications Nos 2002/5395, 2002/5960 and 2002/6532.

As an alternative, the binder may be introduced into the open cells of the foam element by impregnating the binder into the open cells of the foam element under pressure so that the binder penetrates and becomes contained in the open cells of the foam element.

An example of the introduction of a binder into the open cells of a foam element by impregnation under pressure will now be given.

Figure 1 is a schematic diagram of this method of the invention. A length of an open cell polymeric foam element 10 is passed between free rolling feed rollers 12 which have a clutch controlled resistance so as to apply a tension to the open cell polymeric foam element 10. The open cell polymeric foam element 10 is pulled by a perforated feed roller 14, rotating in the direction shown. At the feed roller 14, a binder in slurry or liquid form is impregnated into the open cell polymeric foam element 10 through a feed galley 16 in an assembly 18. As the binder in slurry or liquid form is injected into one side of the open cell polymeric foam element 10, air in the open cells is exhausted from the other side of the open cell polymeric foam element 10.

Optionally, compression rollers 20 may compress the open cell polymeric foam element 10 to ensure uniform wetting and penetration of the binder.

The open cell polymeric foam element 10 now impregnated from one side is then wound around a second perforated feed roller 22, rotating in the opposite direction to the feed roller 14. The feed roller 22 includes a feed galley 24 in an assembly 26 which injects the binder in slurry or liquid form into the opposite side of the open cell polymeric foam element 10, with air again escaping from the side of the open cell polymeric foam element 10 not being impregnated.

The assembly again may include compression rollers 28 to ensure uniform wetting and penetration of the binder.

The impregnated open cell foam element 10 is then deposited onto a conveyor 30.

Adjustable tension rollers 32 control the tension in the open cell polymeric foam element 10 as well as the area of surface contact with the perforated feed rollers 14 and 22.

The binder impregnated into the open cell polymeric foam element 10 is then allowed to set or harden and dry to form the finished product.

As an alternative, the binder may be impregnated under pressure into the open cells of the foam element from one side thereof only, the binder penetrating through the thickness of the foam element.

As indicated in the prior filed applications, before the binder sets or hardens, the foam element containing the binder may be formed into a desired shape. Further examples of this are illustrated in Figures 2a, 2b, 3 and 4.

Referring to Figure 2a, a length of an open cell polymeric foam element 40 impregnated with a binder which has not yet set, is spirally wound onto a removable pipe blank or mandrel 42. When the binder sets or hardens, there is formed a length of a pipe or tube.

The pipe or tube may be used as such, for example, as a drainage pipe for agriculture, as an irrigation pipe, or, the length of pipe may be used as a core for a pipe composite.

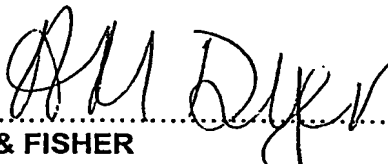
The pipe so made has the advantages that it is lightweight, can be produced economically, and yet is effective in use.

Referring to Figure 2b, as an alternative, a length of an impregnated open cell polymeric foam element 44 may have its elongate edges joined together to form a tube which may then be drawn over a former 46. Once the binder has set or hardened, the former 46 may be removed leaving a length of a pipe which may be used as described above.

Referring to Figure 3, a length of an impregnated open cell polymeric foam element 50 is rolled into a circular form and then drawn by a line 52 tied at 54 into a spirally wound paper pipe 56 via a feed funnel 58. The pipe 56 may optionally have been pre-impregnated with a thermosetting resin composite to increase its bursting strength. The binder is allowed to set or harden thus forming an elongate element 60 which may be used as a post or pole. In particular, it may be used as a mine support in underground mining, or as support member for signage or the like.

In another embodiment of the invention, when the binder is a hydraulic binder slurry, the hydraulic binder slurry may be foamed by any method known in the art, i.e the use of a pre-formed foam or the use of a foaming agent which foams in situ, to give a lightweight hydraulic binder slurry. The resulting product has a low density and yet a high thermal insulation and thus is suitable for all thermal insulation applications, particularly the insulation of buildings.

Dated this 10th day of October 2002

  
.....  
**SPOOR & FISHER**  
**APPLICANT'S PATENT ATTORNEYS**

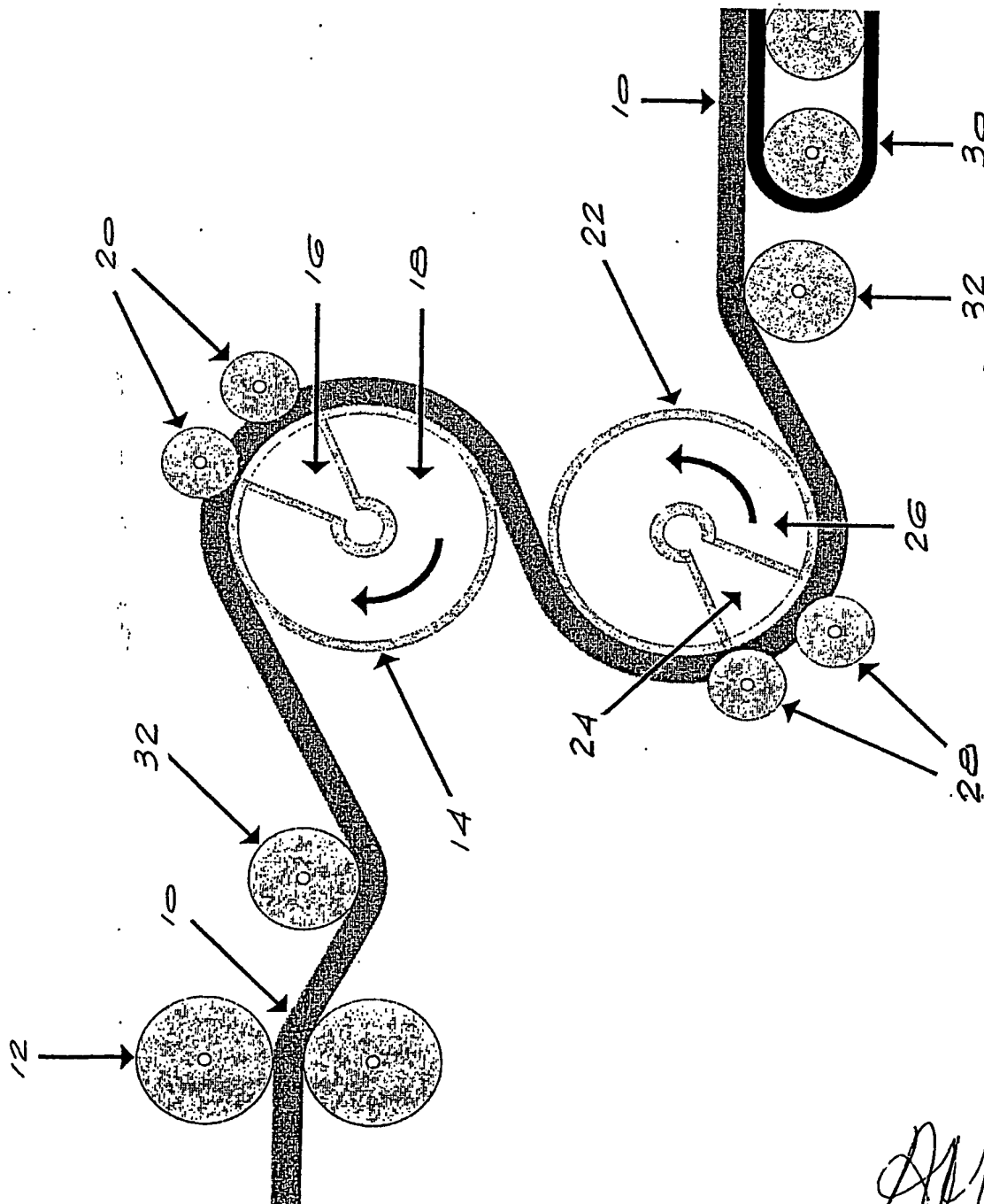


Fig 1

*Att Dye*

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Applicant's Patent Attorneys

2002/8170

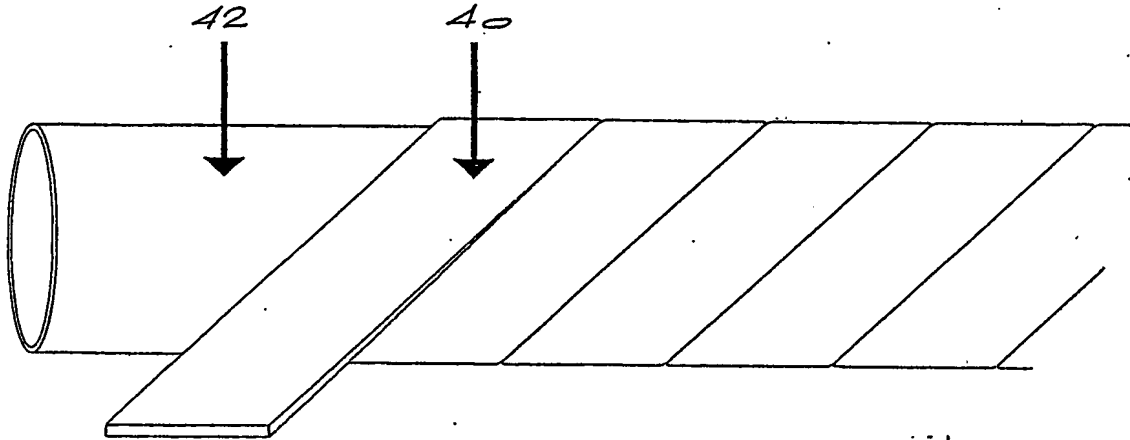


FIG 2a

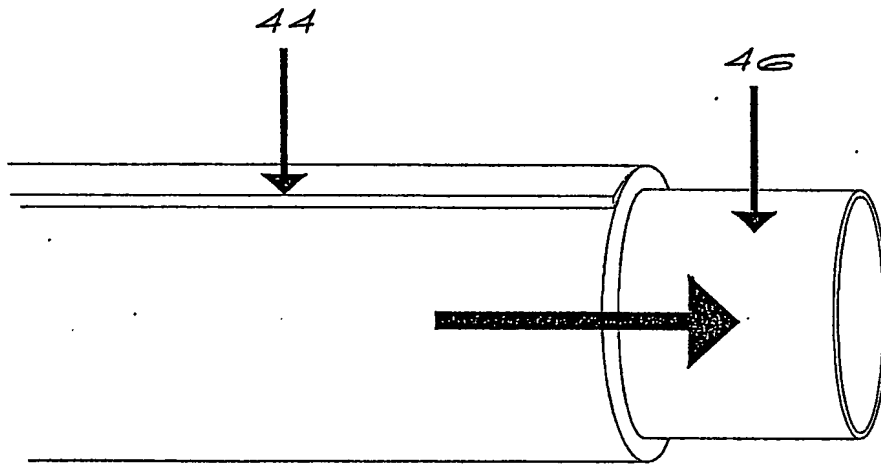


FIG 2b

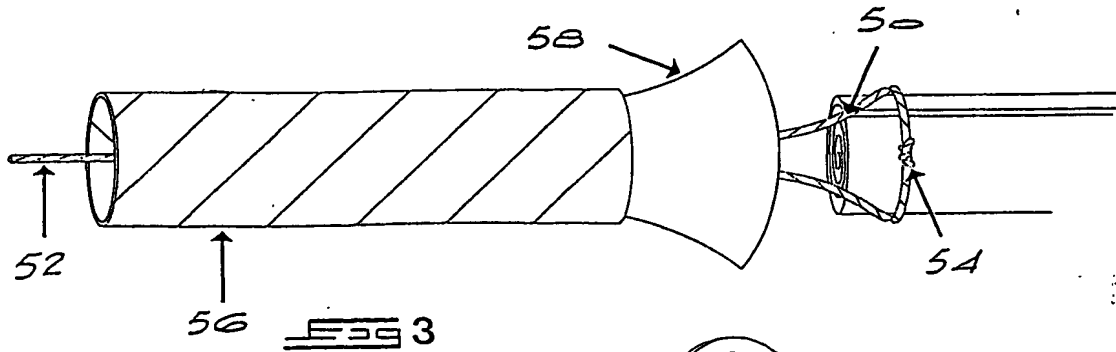


FIG 3



FIG 4

*AM Dyk*  
 SPOOR & FISHER  
 Applicant's Patent Attorneys

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